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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

REDDY, KARUNA P

ART UNIT

PAPER NUMBER

1764

MAIL DATE

DELIVERY MODE

12/10/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/539,792	Applicant(s) HUSEMANN ET AL.	
	Examiner KARUNA P. REDDY	Art Unit 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 9-12, 14-17, 19 and 20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 9-12, 14-17 and 19-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. In view of the Appeal Brief filed on 11/8/2010, PROSECUTION IS HEREBY REOPENED. New grounds of rejection via a non-final action are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below.

2. Claims 1-6, 9-12, 14-17 and 19-20 are currently pending in the application.
3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

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4. Claims 1-2, 4-6, 9-11, 14-17 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt et al (5,910,522) in view of Koeble et al (US 4,217,434) and Prucker et al (Macromolecules 1998, 31, 602-613).

Schmidt et al disclose an adhesive comprising a transparent polymer and/or polymerizable oligomer and/or polymerizable monomer suitable for use as an adhesive, nanoscale inorganic particles and optionally compounds for surface modification of said inorganic particles (column 8, claim 1). Polymers that can be preferably employed as transparent polymers include polyacrylates and polymethacrylate. Instead of the mentioned polymers, oligomers and/or precursors (monomers) thereof may be employed as well (column 3, lines 39-61). The listing of nanoscale inorganic particles includes silicates and SiO₂ (column 4, line 6-10) which has a particle size preferably from 2 to 50 nm and particularly 5 to 20 nm (column 4, lines 36-37). Suitable surface modifier, i.e. surface modifying low molecular weight compounds have at least one functional group capable of reacting with groups present on the surface of powdered particles. Thus, an acid/base reaction may take place between the functional groups of surface modifying compound and surface groups of particles (column 5, lines 29-48). Examples of surface modifier compounds include mono and polycarboxylic acids having 1 to 12 carbon atoms such as acrylic acid and methacrylic acid as well as their esters e.g. methyl methacrylate (column 5, lines 55-63).

The nanoscale particles may be dispersed in one of the solvents and one of the polymerizable compounds (col. 6, lines 34-37). The polymer and polymerizable compounds may be dissolved in or mixed into a stable dispersion of the nanoscale particles, optionally with addition of the surface modifying substances (column 6, lines 44-48). If polymerizable compounds are used, the adhesive also contains thermal or

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photochemical crosslinking initiators (column 6, lines 49-54). If the adhesive contains a crosslinkable compound, said compound is crosslinked and cured thermally and/or by irradiation depending on the type of crosslinking initiator employed (column 7, lines 19-24). It is the examiner's position that surface modification, of nanoscale particle (i.e. filler), with polymer is implicit in the use of polymerizable compounds as surface modifying substances in the presence to thermal or photochemical crosslinking initiators. Examples of thermal initiators include azobisisobutyronitrile, dibenzoyl peroxide and t-butylperbenzoate (column 7, lines 1-6). Examples of photoinitiators include 1-hydroxycyclohexylphenyl ketone and others (col. 6, lines 55-67) which reads on double bond functionalized photoinitiator of instant claims. Curing conditions (UV wavelength) depend on the decomposition conditions of crosslinking initiator (col. 7, lines 25-27). It is noted that UV wavelength encompasses UV irradiation in the range of from 200 to 400 nm of instant claims.

A working example of the preparation of adhesive includes mixing methyl methacrylate, SiO₂ and styrene (column 7, lines 53-56). The density of methyl methacrylate and styrene is 0.933 g/cm³ and 0.907 g/cm³ respectively (Knovel critical tables - Publication 2003). Therefore, ratio of methyl methacrylate and styrene in working example will read on the weight percentages used in claim 4. The finished adhesive is applied onto a substrate or said substrate is dipped into said adhesive (column 7, lines 13-14).

Schmidt et al is silent with respect to pressure-sensitive adhesive; and coating of filler (i.e. silicate and/or silica gel) with polyacrylate that is chemically bonded to a free-radical initiator which free radical initiator is chemically bonded to silicate and/or silica gel.

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However, Schmidt et al in the general disclosure teach that polymers a), nanoscale particles b) and optionally the surface-modifying substances c) may be employed either as such or preferably, as solution in an organic solvents. Examples of suitable solvents are alcohols such as butanol, ketones, hydrocarbons such as hexane, benzene and toluene (col. 6, lines 23-31). Furthermore, Koeble teaches that acrylic pressure sensitive adhesives are well known class of compositions. They are initially liquid adhesive formulations which generally contain a) from about 45 to 65%, by weight of the formulation, of a suitable organic solvent such as butanol, hexane and others; b) from about 16% to about 45%, by weight of the formulation, of polyacrylate component and are generally alkyl esters of either acrylic or methacrylic acid (col. 1, lines 40-67; col. 2, lines 1-5); and c) up to about 5% by weight, of the formulation, of one or more of the following functional additives that include fillers such as silicates. Therefore, given that the adhesive of Schmidt et al comprises solvents, poly(meth)acrylates, and a filler as in the pressure sensitive adhesive formulation of Koeble, the adhesive composition of Schmidt et al is intrinsically capable of functioning as a pressure sensitive adhesive when formulated as a composition comprising solvent, transparent polyacrylates and the silicate filler, in well known proportions used to prepare pressure sensitive adhesives.

With respect to coating of filler (i.e. silicate and/or silica gel) with polyacrylate that is chemically bonded to a free-radical initiator which free radical initiator is chemically bonded to silicate and/or silica gel, Prucker et al teach that grafting of polymer on solid surface by reaction of functional group of the preformed polymer with a corresponding site on the surface of substrate is hampered by intrinsic limitation of the graft density and accordingly layer thickness due to strong kinetic hindrance for the attachment of polymer molecules once the surface is significantly covered. Several studies are done wherein

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the initiators are attached to the surface of solid substrates (page 602, col. 1, lines 1-21). See figure 1 of Prucker et al, wherein reaction scheme shows covalently attached polymer monolayers on silica surfaces using immobilized AIBN-type azo initiators. Therefore, in light of the teachings in Prucker et al, it would have been obvious to one skilled in art at the time invention was made to attach the azo initiator, of Schmidt et al, to surface of solid materials, such as the nanoparticulate silicates and SiO_2 of Schmidt et al, and polymerize the monomers of Schmidt et al (i.e. acrylic acid and methacrylic acid), because Schmidt et al contemplates surface modification of nanoparticles with polymers and Prucker et al has shown that graft density and accordingly layer thickness of polymer on the solid surface can be controlled by attaching initiator to the solid surface and then polymerizing monomer on the said surface, and one of ordinary skill in art would expect such a modification to work for the nanoparticle of Schmidt et al, motivated by expectation of success.

5. Claims 3 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt et al (5,910,522) in view of Prucker et al (Macromolecules 1998, 31, 602-613).as evidenced by Knovel (Knovel critical tables - Publication 2003).

The discussion with respect to Schmidt et al in paragraph 4 above is incorporated herein by reference.

Schmidt et al is silent with respect to weight fraction of polyacrylate coated particles of silicate and/or silica gel.

However, the proportion of nanoscale particles in adhesive composition of Schmidt et al is from 1 to 50 % by volume (column 4, lines 55-56) and weight fraction of instant claim is from 0.5 to 25. The density of inorganic silicates varies over a wide

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range from 2.0 to 6.5 (see Knovel critical table for density of inorganic silicates). Hence, it is the examiner's position that volume percentages of silicate in Schmidt et al overlaps with weight fraction of present claim. Therefore, it would have been obvious to one skilled in art at the time invention was made to have selected the overlapping range (i.e. weight fraction of 0.5 to 25), from Schmidt et al because court held that when the range of instant claims and that disclosed in prior art overlap, a prima facie case of obviousness exists. See *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976). See MPEP § 2144.05.

Response to Arguments

6. Applicant's arguments with respect to examiner not addressing the pressure-sensitive property of the adhesive have been considered but are moot in view of the new ground(s) of rejection set forth in paragraph 5 above.
7. Applicant's arguments filed 11/8/2010 have been fully considered but they are not persuasive. Specifically, applicant argues (A) Schmidt teaches optional surface modification of nanoscale particles for the purpose of avoiding agglomeration of the particles. These are generally small molecules and there is no teaching or suggestion that the nanoscale particles be surface modified with polymers; (B) persons skilled in the art must make a number of selections within Schmidt's disclosure to arrive at the instant claims - polyacrylates from a large number of polymers, silicate or silica gel as the filler, small size of the filler, modifying the surface of nanoparticles with initiators and thermally cure to yield a polyacrylate chemically bonded to silicate.

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With respect to (A), as stated earlier, Schmidt et al teach that the nanoscale particles may be dispersed in one of the solvents and one of the polymerizable compounds (col. 6, lines 34-37). The polymer and polymerizable compounds may be dissolved in or mixed into a stable dispersion of the nanoscale particles, optionally with addition of the surface modifying substances (column 6, lines 44-48). If polymerizable compounds are used, the adhesive also contains thermal or photochemical crosslinking initiators (column 6, lines 49-54). If the adhesive contains a crosslinkable compound, said compound is crosslinked and cured thermally and/or by irradiation depending on the type of crosslinking initiator employed (column 7, lines 19-24). Hence, it is the examiner's position that when polymerizable compounds such as acrylic acid and methacrylic acid as well as their esters e.g. methyl methacrylate are used as surface modifying compounds, polymerization of these monomers (i.e. small molecules), on the surface of nanoscale particles, is implicit in the teachings of Schmidt.

With respect to (B), applicant's attention is drawn to Schmidt et al wherein it states - polymers particularly preferred are transparent polymers such as polyacrylates and PMMA (col. 3, lines 58-60); SiO₂ particles show additional advantage of a thixotropic effect when being dispersed in a polymer matrix (col. 4, lines 38-44); and nanoparticles preferably have a size of 2 to 50 nm and particularly 5 to 20 nm (col. 4, lines 36-38). In addition, Prucker provides the motivation to modify the surface of nanoparticles with initiators and polymerize a monomer to yield a polyacrylate chemically bonded to silicate via the initiator.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KARUNA P. REDDY whose telephone number is (571)272-6566. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. P. R./
Examiner, Art Unit 1764

/Vasu Jagannathan/
Supervisory Patent Examiner, Art Unit 1764